Design and Technology Subject Progression

Progression of the skills and knowledge framework by key concepts

Big idea	Aspect	Year 3	Year 4	Year 5	Year 6
Humankind	Everyday products	☐ Particular products have been designed for specific tasks, such as nail clippers, the spinning top and the cool box. Explain how an existing product benefits the user. **covered x 2**	☐ Design features are the aspects of a product's design that the designer would like to emphasise, such as the use of a particular material or feature that makes the product easier to use or more durable. Investigate and identify the design features of a familiar product. **covered x 6** **optional x 2**	☐ Culture is the language, inventions, ideas and art of a group of people. A society is all the people in a community or group. Culture affects the design of some products. For example, knives and forks are used in the western world, whereas chopsticks are used mainly in China and Japan. The design of products needs to take into account the culture of the target audience. For example, colours might mean very different things in different cultures. Explain how the design of a product has been influenced by the culture or society in which it was designed or made. **covered x 3**	☐ People's lives have been improved in countless ways due to new inventions and designs. For example, the Morrison shelter, designed by John Baker in 1941, was an indoor air-raid shelter used in over half a million homes during the Second World War. It saved the lives of many people caught in bombing raids. Analyse how an invention or product has significantly changed or improved people's lives. **covered x 3** **optional**
	Staying safe	☐ Electrical appliances must only be used under the supervision of an adult. Safety rules must also be followed when using electricity: fingers and other objects must not be put into electrical outlets, anything with a cord or plug should never be used around water and a plug should never be pulled out by its cord. Use appliances safely with adult supervision. **covered** **optional x 3**	☐ Chemicals are used in the home every day. They include cleaning products, such as bleach and disinfectant, but also paints, glues, oils, pesticides and medicines. Most chemical products carry a hazard symbol showing in what way the chemical could be harmful. Chemicals should only be used under adult supervision. Appropriate safety precautions, such as wearing goggles and gloves, working in a well-ventilated room, wiping up spills and tying back long hair, should be taken. Work safely with everyday chemical products under supervision, such as disinfectant hand wash and surface cleaning spray. **covered**	☐ Safety features are often incorporated into products that might cause harm. Some examples include the child-safety caps on medicine bottles, seatbelts in cars, covers for electrical sockets and finger guards on doors. Explain the functionality and purpose of safety features on a range of products. **covered**	☐ The safety of the user has to be taken into account when designing a new product. Methods to help keep users safe include providing clear instructions for use; clear indication of the age range for which it is designed; safety features (such as child-resistant packaging); warning symbols and electrical safety checks. Demonstrate how their products take into account the safety of the user. **covered**
Processes	Mechanisms and movement	☐ Levers consist of a rigid bar that rotates around a fixed point, called a fulcrum. They reduce the amount of work needed to lift a heavy object. Sliders move from side to side or up and down, and are often used to make moving parts in books. Axles are shafts on which wheels can rotate to make a moving vehicle. Cams are devices that can convert circular motion into up-and-down motion. Explore and use a range of mechanisms (levers, sliders, axles, wheels and cams) in models or products. **covered x 3** **optional**	☐ Mechanisms can be used to add functionality to a model. For example, sliders or levers can be used in moving pictures, storybooks or simple puppets; linkages in moving vehicles or puppets; gears in motorised vehicles or spinning toys; pulleys in cable cars or transport systems and cams in 3-D moving toys or pictures. Explore and use a range of mechanisms (levers, axles, cams, gears and pulleys) in models or products. **covered x 3** **optional**	☐ Pneumatic systems use energy that is stored in compressed air to do work, such as inflating a balloon to open a model monster's mouth. These effects can be achieved using syringes and plastic tubing. Use mechanical systems in their products, such as pneumatics. **covered x 3** **optional x 2**	☐ Mechanical systems can include sliders, levers, linkages, gears, pulleys and cams. Other mechanisms include pneumatics and hydraulics. Explain and use mechanical systems in their products to meet a design brief. Assign

Design and Technology Subject Progression

Progression of the skills and knowledge framework by key concepts

Big idea	Aspect	Year 3	Year 4	Year 5	Year 6
	Electricity	☐ An electric circuit can be used in a model, such as a lighthouse. It can be controlled using a switch. Incorporate a simple series circuit into a model. Assign	☐ Components can be added to circuits to achieve a particular goal. These include bulbs for lighthouses and torches, buzzers for burglar alarms and electronic games, motors for fairground rides and motorised vehicles and switches for lights and televisions. Incorporate circuits that use a variety of components into models or products. **covered** **optional x 2**	☐ Electrical circuits can be controlled by a simple on/off switch, or by a variable resistor that can adjust the size of the current in the circuit. Real-life examples are a dimmer switch for lights or volume control on a stereo. Use electrical circuits of increasing complexity in their models or products, showing an understanding of control. Assign	☐ Computer programs can control electrical circuits that include a variety of components, such as switches, lamps, buzzers and motors. Understand and use electrical circuits that incorporate a variety of components (switches, lamps, buzzers and motors) and use programming to control their products. **covered x 2** **optional**
Creativity	Generation of ideas	☐ Design criteria are the exact goals a project must achieve to be successful. These criteria might include the product's use, appearance, cost and target user. Develop design criteria to inform a design. **covered x 3**	☐ Annotated sketches and exploded diagrams show specific parts of a design, highlight sections or show functions. They communicate ideas in a visual, detailed way. Use annotated sketches and exploded diagrams to test and communicate their ideas. **covered x 4** **optional x 3**	☐ A pattern piece is a drawing or shape used to guide how to make something. There are many different computer-aided design packages for designing products. Use pattern pieces and computer-aided design packages to design a product. **covered**	☐ Design criteria should cover the intended use of the product, age range targeted and final appearance. Ideas can be communicated in a range of ways, including through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design. Develop design criteria for a functional and appealing product that is fit for purpose, communicating ideas clearly in a range of ways. **covered x 2**
	Structures	☐ Shell structures are hollow, 3-D structures with a thin outer covering, such as a box. Frame structures are made from thin, rigid components, such as a tent frame. The rigid frame gives the structure shape and support. Diagonal struts can strengthen the structure. Create shell or frame structures using diagonal struts to strengthen them. **covered**	☐ A prototype is a mock-up of a design that will look like the finished product but may not be full size or made of the same materials. Shell and frame structures can be strengthened by gluing several layers of card together, using triangular shapes rather than squares, adding diagonal support struts and using 'Jinks' corners (small, thin pieces of card cut into a right-angled triangle and glued over each joint to straighten and strengthen them). Prototype shell and frame structures, showing awareness of how to strengthen, stiffen and reinforce them. **covered**	☐ Various methods can be used to support a framework. These include cross braces, guy ropes and diagonal struts. Frameworks can be built using lolly sticks, skewers and bamboo canes. Build a framework using a range of materials to support mechanisms. **covered x 3**	☐ Strength can be added to a framework by using multiple layers. For example, corrugated cardboard can be placed with corrugations running alternately vertically and horizontally. Triangular shapes can be used instead of square shapes because they are more rigid. Frameworks can be further strengthened by adding an outer cover. Select the most appropriate materials and frameworks for different structures, explaining what makes them strong. **covered x 2**
	Use of ICT	☐ A program is a set of instructions written to perform a specified task on a computer. Write a program to make something move on a tablet or computer screen. Assign	☐ Remote control is controlling a machine or activity from a distance. Computers can be used to remotely control a device, such as a light, speaker or buzzer. Write a program to control a physical device, such as a light, speaker or buzzer. **covered x 2** **optional**	☐ Equipment and devices can be controlled by pressing buttons on a control panel, such as on a washing machine or microwave. Link a physical device to a computer or tablet so that it can be controlled (such as changing motor speed or turning an LED on and off) by a program. Assign	☐ Computer monitoring uses sensors as a scientific tool to record information about environmental changes over time. Computer monitoring can also log data from sensors and record the resulting information in a table or graph. Use a sensor to monitor an environmental variable, such as temperature, sound or

Design and Technology Subject Progression

Progression of the skills and knowledge framework by key concepts

Big idea	Aspect	Year 3	Year 4	Year 5	Year 6
					light. covered x 2
Investigation	Investigation	☐ Specific tools can be used for cutting, such as saws. Wood can be joined using glue, nails, staples, or a combination of these. Safety rules must be followed to prevent injury from sharp blades. These rules include using a bench hook to keep the wood still, using a junior hacksaw with a pistol grip and working under adult supervision. Use tools safely for cutting and joining materials and components. covered x 4 optional	☐ Useful tools for cutting include scissors, craft knives, junior hacksaws with pistol grip and bench hooks. Useful tools for joining include glue guns. Tools should only be used with adult supervision and safety rules must be followed. Select, name and use tools with adult supervision. covered	☐ There are many rules for using tools safely and these may vary depending on the tools being used. For example, someone using a chisel should chip or cut with the cutting edge pointing away from their body. All tools should be cleaned and put away after use, and should not be used if they are loose or cracked. Name and select increasingly appropriate tools for a task and use them safely. covered	☐ Precision is important in producing a polished, finished product. Correct selection of tools and careful measurement can ensure the parts fit together correctly. Select appropriate tools for a task and use them safely and precisely. covered x 2 optional x 2
	Evaluation	☐ Asking questions can help others to evaluate their products, such as asking them whether the selected materials achieved the purpose of the model. Suggest improvements to their products and describe how to implement them, beginning to take the views of others into account. covered x 4 optional	☐ Evaluation can be done by considering whether the product does what it was designed to do, whether it has an attractive appearance, what changes were made during the making process and why the changes were made. Evaluation also includes suggesting improvements and explaining why they should be made. Identify what has worked well and what aspects of their products could be improved, acting on their own suggestions and those of others when making improvements. covered x 4	☐ Testing a product against the design criteria will highlight anything that needs improvement or redesign. Changes are often made to a design during manufacture. Test and evaluate products against a detailed design specification and make adaptations as they develop the product. covered x 3 optional x 2	☐ Design is an iterative process, meaning alterations and improvements are made continually throughout the manufacturing process. Evaluating a product while it's being manufactured, and explaining these evaluations to others, can help to refine it. Demonstrate modifications made to a product as a result of ongoing evaluation by themselves and to others. covered x 3 optional x 2
Materials	Cutting and joining textiles	☐ A loom is a piece of equipment that is used for making fabric by weaving wool or thread. Weaving involves interlacing pieces of thread or yarn. Cut and join wools, threads and other materials to a loom. covered	☐ A hem runs along the edge of a piece of cloth or clothing. It is made by turning under a raw edge and sewing to give a neat and quality finish. Hand sew a hem or seam using a running stitch. covered	☐ A collage is artwork made by sticking materials, such as scraps of paper or fabric, onto a background. A mixed media collage is made using various materials and media, such as ink and paint. Combine stitches and fabrics with imagination to create a mixed media collage. covered	☐ Pinning with dressmaker pins and tacking with quick, temporary stitches holds fabric together in preparation for and during sewing. Pin and tack fabrics in preparation for sewing and more complex pattern work. covered x 2
	Decorating and embellishing textiles	☐ A loom weaving is a piece of fabric that has been woven on a loom by interlacing threads. An embellishment is a decorative detail or feature, such as a silk flower, tassel or bow, added to something to make it more attractive. Decorate a loom weaving using embellishments, such as natural or silk flowers, tassels and bows. covered	☐ Block printing techniques and fabric paint are used to create decorative, repeated patterns on fabrics. Create detailed decorative patterns on fabric using printing techniques. covered	☐ Applique is a technique where pieces of material are attached to another material by stitching or gluing. Use applique to add decoration to a product or artwork. covered	☐ Fastenings hold a piece of clothing together. Types of fastenings include zips, press studs, Velcro and buttons. Use different methods of fastening for function and decoration, including press studs, Velcro and buttons. covered

Design and Technology Subject Progression

Progression of the skills and knowledge framework by key concepts

Big idea	Aspect	Year 3	Year 4	Year 5	Year 6
	Materials for purpose	☐ Materials for a specific task must be selected on the basis of their properties. These include physical properties as well as availability and cost. Plan which materials will be needed for a task and explain why. covered x 2 optional	☐ Different materials and components have a range of properties, making them suitable for different tasks. It is important to select the correct material or component for the specific purpose, depending on the design criteria. Recipe ingredients have different tastes and appearances. They look and taste better and are cheaper when in season. Choose from a range of materials, showing an understanding of their different characteristics. covered x 5 optional x 4	☐ Materials should be cut and combined with precision. For example, pieces of fabric could be cut with sharp scissors and sewn together using a variety of stitching techniques. Select and combine materials with precision. covered x 2 optional x 3	☐ It is important to understand the characteristics of different materials to select the most appropriate material for a purpose. This might include flexibility, waterproofing, texture, colour, cost and availability. Choose the best materials for a task, showing an understanding of their working characteristics. covered x 4 optional x 3
Nature	Nutrition	☐ There are five main food groups that should be eaten regularly as part of a balanced diet: fruit and vegetables; carbohydrates (potatoes, bread, rice and pasta); proteins (beans, pulses, fish, eggs and meat); dairy and alternatives (milk, cheese and yoghurt) and fats (oils and spreads). Foods high in fat, salt and sugar should only be eaten occasionally as part of a healthy, balanced diet. Identify the main food groups (carbohydrates, protein, dairy, fruits and vegetables, fats and sugars). covered	☐ Healthy snacks include fresh or dried fruit and vegetables, nuts and seeds, rice cakes with low-fat cream cheese, homemade popcorn or chopped vegetables with hummus. A healthy packed lunch might include a brown or wholemeal bread sandwich containing eggs, meat, fish or cheese, a piece of fresh fruit, a low-sugar yoghurt, rice cake or popcorn and a drink, such as water or semi-skimmed milk. Design a healthy snack or packed lunch and explain why it is healthy. covered x 3	☐ A balanced diet gives your body all the nutrients it needs to function correctly. This means eating a wide variety of foods in the correct proportions. Evaluate meals and consider if they contribute towards a balanced diet. covered x 3 optional	☐ Eating a balanced diet is a positive lifestyle choice that should be sustained over time. Food that is high in fat, salt or sugar can still be eaten occasionally as part of a balanced diet. Plan a healthy daily diet, justifying why each meal contributes towards a balanced diet. covered
	Food preparation and cooking	☐ Preparation techniques for savoury dishes include peeling, chopping, deseeding, slicing, dicing, grating, mixing and skinning. Prepare and cook a simple savoury dish. covered x 3	☐ Cooking techniques include baking, boiling, frying, grilling and roasting. Identify and use a range of cooking techniques to prepare a simple meal or snack. covered	☐ Sweet dishes are usually desserts, such as cakes, fruit pies and trifles. Savoury dishes usually have a salty or spicy flavour rather than a sweet one. Use an increasing range of preparation and cooking techniques to cook a sweet or savoury dish. covered x 2 optional	☐ Ingredients can usually be bought at supermarkets, but specialist shops may stock different items. Greengrocers sell fruit and vegetables, butchers sell meat, fishmongers sell fresh fish and delicatessens usually sell some unusual prepared foods, as well as cold meats and cheeses. Follow a recipe that requires a variety of techniques and source the necessary ingredients independently. covered x 3
	Origins of food	☐ The types of food that will grow in a particular area depend on a range of factors, such as the rainfall, climate and soil type. For example, many crops, such as potatoes and sugar beet, are grown in the south-east of England. Wheat, barley and vegetables grow well in the east of England. Identify and name foods that are	☐ Particular areas of the world have conditions suited to growing certain crops, such as coffee in Peru and citrus fruits in California in the United States of America. Identify and name foods that are produced in different places in the UK and beyond. covered	☐ Seasonality is the time of year when the harvest or flavour of a type of food is at its best. Buying seasonal food is beneficial for many reasons: the food tastes better; it is fresher because it hasn't been transported thousands of miles; the nutritional value is higher; the carbon footprint is lower, due to reduced transport; it supports local growers and is	☐ Organic produce is food that has been grown without the use of man-made fertilisers, pesticides, growth regulators or animal feed additives. Organic farmers use crop rotation, animal and plant manures, hand-weeding and biological pest control. Explain how organic produce is grown. covered

Design and Technology Subject Progression

Progression of the skills and knowledge framework by key concepts

Big idea	Aspect	Year 3	Year 4	Year 5	Year 6
		produced in different places. **covered**		usually cheaper. Describe what seasonality means and explain some of the reasons why it is beneficial. **covered x 3** **optional x 4**	
Comparison	Compare and contrast	☐ Work from different designers can be compared by assessing specific criteria, such as their visual impact, fitness for purpose and target market. Explain the similarities and difference between the work of two designers. **covered**	☐ A comparison table can be used to compare products by listing specific criteria on which each product can be judged or scored. Create and complete a comparison table to compare two or more products. **covered x 3**	☐ A focus group is a small group of people whose reactions and opinions about a product are taken and studied. Evaluations can be made by asking product users a selection of questions to obtain data on how the product has met its design criteria. Survey users in a range of focus groups and compare results. **covered**	☐ Products and inventions can be compared using a range of criteria, such as the impact on society, ease of use, appearance and value for money. Create a detailed comparative report about two or more products or inventions. **covered x 4**
Significance	Significant people	☐ Key inventions in design and technology have changed the way people live. Describe how key events in design and technology have shaped the world. **covered** **optional**	☐ Significant designers and inventors can shape the world. Explain how and why a significant designer or inventor shaped the world. **covered x 3** **optional**	☐ Many new designs and inventions influenced society. For example, labour-saving devices in the home reduced the amount of housework, which was traditionally done by women. This enabled them to have jobs. Describe the social influence of a significant designer or inventor. **covered**	☐ The significance of a designer or inventor can be measured in various ways. Their work may benefit society in health, transport, communication, education, the built environment or technology. It may enhance culture in different areas, such as fashion, ceramics or computer games. Present a detailed account of the significance of a favourite designer or inventor. **covered**